George's PINK PAGE

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SPECIAL EDITION

ARE CHEMICALS PAST HISTORY?

All Beekeepers want to see the end of using chemicals for killing mites, and I predict that we are close to accomplishing that.

I am very proud of my Scottish ancestry as well as being a scientist; and this reminds me of the story of penicillin. A Scottish biologist, Dr. Alexander Fleming discovered penicillin in 1928, but no one made any attempt to make good use of it until the wound problems of World War II. This scenario might by duplicated by the increased development of hygienic bees (HYG) and aided by the management "tool" of Integrated Pest Management (IPM)

Pray tell, what are HYG bees? Where do they come from? Which scientists have actively pursued this concept? HYG bees are NOT bees that use a lot of soap or scrub behind their ears for those thinking in an anthropomorphic sense. HYG bees are those that quickly clean the "nest" of abnormal items that may be deleterious to the health of the colony or items containing pathogens that may promote disease. Bees that quickly determine that some brood is dead and make haste in removing it to perhaps distance of 100 yards or more from the colony are a good example of hygienic bees. All of us have seen humans that are just naturally neat and clean, while others are disorganized and messy. Bees are the same, and there is evidence that indicates that the breeding of the bee is the primary discerning factor between "clean" bees and "messy" bees. I have seen auto mechanics that can change the clutch in a car and not have a spot of dirt or grease anywhere on his clothes or body except his hands; whereas there are others that just get in your car to look at the odometer and leave grease spots on the upholstery and grease on the steering wheel. Some people, as well as bees, just have a knack for being clean and organized, while others do not. Back in the Great Depression Days of 1934-35, when scientists were badly underpaid but carried on out of love of science, Drs. Park, Pellett, and Paddock found 25 colonies from various parts of the U.S. which were believed to show some resistance to the violently deprivating disease of that time, American Foul Brood. They introduced spores of AFB into these so-called resistant colonies along with 6 regular non-resistant colonies as a "control", and found that all 6 of the control colonies were infected with AFB disease at the end of the year, but 7 (28%) of the so-called resistant colonies were free of disease at year's end. They moved these resistant colonies to an isolated mating station in Texas where a new generation of queens and drones were allowed to mate and the resulting colonies were tested as before. This was done for the next 14 years, ending in 1949, and using as many as 148 resistant colonies in 1939 and 101 in 1946. The colonies that stayed free of the AFB disease kept increasing year after year to 98% disease free in 1949! Based on that work, Dr. W. C. Rothenbuhler of Ohio State University initiated a similar program in the 1960's, but used a controlled mating technique by artificially inseminating the queens with semen from selected drones. This work by Rothenbuhler and Steve Taber had to be terminated because of inbreeding depression, and the lack of money to enlarge the research program, because the use of Terramycin to control the advancement of AFB seemed to be satisfactory to the beekeeping "fraternity". However, the work of Park, Rothenbuhler, and others clearly indicated that there is a genetic factor in the characteristics of each bee that has some control over things like disease control, or honey production; and if these factors were

researched further, the queen and bee breeders' task of supplying the after-market HYGIENIC BEES, or higher honey producing bees, would become much easier. No one seemed interested in pursuing this approach for about the next 30 years, when the whole program of beekeeping had to be revamped to offset the massive death of bees caused by the tracheal mite and the varroa mite. About 5-10 years ago, Dr. Marla Spivak, Extension agent at the University of Minnesota became interested in bees with HYGIENIC BEHAVIOR. She too, following the precepts set by Park, and Rothenbuhler back in the 30's to 60's developed bees that are clearly "clean" bees, known as Minnesota Hygienic Italian, and Artificially Inseminated Queens of these bees are for sale by Glenn Apiaries in California.

Let me make it quite clear, that just because you purchase something that is advertised as exhibiting hygienic behavior doe NOT mean that your bees will be "clean" bees. It only means that the your bees came from a line that exhibits the genetic trait of good hygienic behavior and hence the chances of your bees truly being clean bees are much enhanced over others. However, as Steve Taber has recently pointed out in Bee Culture Magazine articles, YOU should test your bees yourself. This is done by cutting out a small section of brood, freeze it to kill the brood, and replace the cut-out section back in the frame all within 24 hours, and determine how long before the bees clean out the dead brood. If it is gone within 24 hours, you have clean bees; but if it takes 48 hours or more, you bees are NOT clean bees. If you can't do a simple thing like that, you are more of a beeHAVER than a beeKEEPER, and you would prefer just to buy a pill to give the bees that would free them of mites or disease.

What is I.P.M.? Integrated Pest Management means using various management techniques that reduce the population of mites to tolerable levels. This is essentially the theory of using grease patties to control the population of tracheal mites to the level that the natural body defense mechanisms of the bee can enable the bee to live and productively function without killing the mites. So many chemicals that might be used to kill mites might also injure the bee. Further, as with the case of DDT, scientists have always been aware that the continued use of almost any chemical results in the quarry that is trying to be killed becomes resistant to that chemical. By the way, just because many people think of some things like food grade mineral oil (FGMO), essential oils like wintergreen, peppermint, cloves, mint, canola oil, or vegetable shortening as "non-chemical" because they can be safely eaten, it surely does not mean that they are NOT chemicals. There are millions of people who would not dream of using 3% acetic acid on their salad, yet that is exactly what vinegar is, 3% acetic acid; or who would think of taking acetyl salicylic acid for a headache, but they use aspirin often which is acetyl salicylic acid. Oh, the fear of the UNKNOWN is so strong with people who lack knowledge! Scientists might have been the very first group of people who did NOT want to use chemicals to kill mites, and preferred to find other means, but those other means took research TIME and research MONEY. Beekeepers demanded a "CHEAP QUICK fix", and mite killing chemicals is what they got, even though the scientists knew that this was going to be temporary. Some beekeepers totally ABUSED and/or MISUSED the chemicals, so more bees were killed by their illegal action and some chemical manufactureres (Miticur) withdrew their fine working chemical (Amitraz) rather than face litigation from a bevy of unhappy beekeepers who had misused the chemical and killed their own bees. The ideal chemical is one that kills the mite but does not damage the bee or the honey, but all pesticides are under the scrutiny of the Environmental Protective Agency (EPA), who might rule out a fine chemical that killed mites and did no injury to bees or honey, BUT is deadly to some endangered species of a cockroach or mosquito. Yes, I am no lover of EPA! Although not yet "caste in stone" there is a good bit of evidence that the use

of 8 mesh wire screen bottom boards on colonies will result in a large enough natural drop off of mites to enable bees to live comfortably with a few mites still on their bodies. Further, because the only place that varroa mite eggs are laid is with the bee larva to provide both food and warmth for the mite eggs to hatch and become adult mites, the female adult mite much prefers to lay mite eggs with drone bee larva rather than worker larva. IPM management would have the beekeeper install one frame of drone size foundation in the brood chamber, wait for the foundation to be drawn into drone cells and the queen to lay it full of drone eggs, and the beekeeper remove the frame of drone brood and destroy it. Repeat as necessary. This would limit the number of varroa mites in a colony to tolerable levels without the use of chemicals. Lastly, starting with the Buckfast hybrid, then the YC-2k Yugo hybrid, and now the Russian hybrid there has been much research done on finding a race of bees or strain of bees that is mite resistant, but to date, there is little evidence that any of stock or race is mite resistant to the point that bees can be kept free of some chemical treatment.

Although at my advanced age, I may not enjoy the fruits of scientific research, I predict that within the next 10-20 years, we will be able to do away with chemicals to kill mites and maybe even some other problems by the use of I.P.M. tools and purchasing of bees with proven HYGIENIC BEHAVIORAL genetic traits.

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Starting my 69th Year of beekeeping in Maryland